

# **JEDEC STANDARD**

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## **Voltage Regulator Diode Noise Voltage Measurement**

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### **JESD307**

**MAY 1965 (Reaffirmed and Revised: JANUARY 1992)  
(Reaffirmed: APRIL 1999, APRIL 2002)**

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**JEDEC SOLID STATE TECHNOLOGY ASSOCIATION**



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## VOLTAGE REGULATOR DIODE NOISE VOLTAGE MEASUREMENT

(From EIA Standards Proposal No. 2406, formulated under the cognizance of EIA/JEDEC JC-22.4 Subcommittee on Regulators and Signal Diodes.)

### 1. SCOPE

This standard is intended to cover the measurement of noise voltage in voltage regulator diodes in the reverse breakdown region. It is intended to describe noise voltage measurement at specified conditions, but may also be used as a guide for making such measurements at other than specified conditions.

### 2. DISCUSSION

The magnitude of noise voltage measured is dependent upon the test circuit used, frequency of measurement, and test conditions. To adequately characterize this parameter, it is important that the test current, noise bandwidth, and characteristics of the response detector (whether RMS, average, or peak-to-peak) be considered. The magnitude is further dependent upon the reverse voltage-current characteristic of the device under test, and upon ambient temperature.

### 3. TEST CONDITIONS TO BE SPECIFIED

- (1) Frequency range of noise being measured.
- (2) Test current and current range.
- (3) Ambient temperature.
- (4) Response detector to be used.

### 4. LIMITATIONS

#### 4.1 Test Current

The minimum should be in the reverse breakdown region of the device under test. The maximum allowable is determined by the maximum current or power rating of the device.

#### 4.2 Minimum Measurable Noise Voltage

Determined by the capability of the specified response detector.

## 5. TEST CIRCUIT

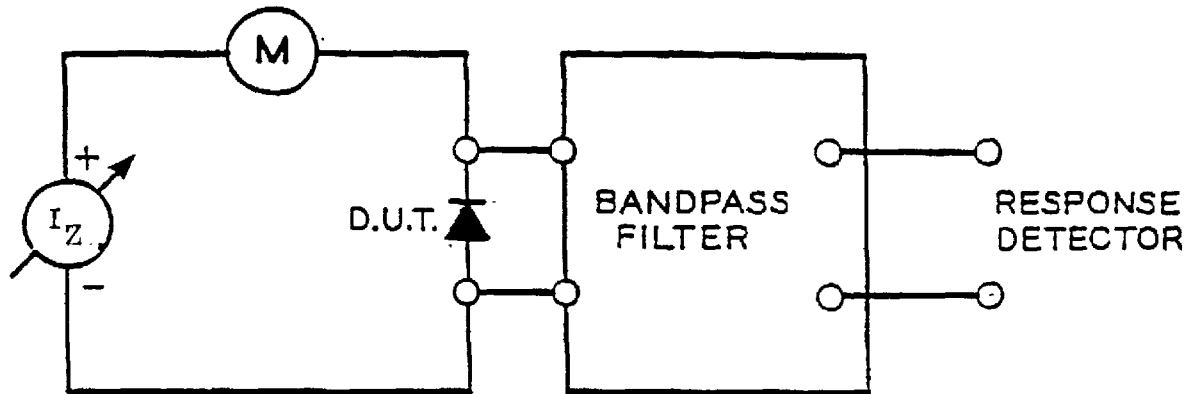


Figure 1  
Test Circuit

### 5.1 $I_Z$

Provisions should be made either to hold  $I_Z$  constant at the desired test value, or to vary  $I_Z$  at a known rate through the breakdown region of interest in the diode.  $I_Z$  is the current through the diode in the breakdown region.

### 5.2 M - dc Current Meter

### 5.3 Bandpass Filter (Optional)

If used, the input impedance should be high compared to the dynamic impedance of the diode under test; also, the skirt selectivity should have a shape factor (the ratio of the bandwidth at 6 db point to that of the 3 db point) of approximately 2. If no bandpass filter is used, the input impedance of the response detector should be high compared to the diode dynamic impedance, and the bandpass characteristic of the response detector becomes a frequency-limiting factor and must meet the same conditions as listed above the filter.

### 5.4 Response Detector

Specify whether the response characteristic is RMS, average, peak-to-peak, or other.

## 6. PROCEDURE

- (1) Place a low noise resistor (equivalent to the dynamic impedance of the diode under test) in the test clips, and adjust the test current to the value at which the regulator diode is to be measured. The residual noise measured should be low compared to that of the diode under test.
- (2) Remove the resistor and place the diode in the test clips.
- (3) Adjust the test current to the desired value or range.
- (4) If noise other than broad band is to be measured, adjust the bandpass filter to obtain the required range.
- (5) Set response detector sensitivity to allow measurement of the maximum specified value of noise voltage.
- (6) Measure the noise voltage.



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## Standard Improvement Form

## JEDEC JESD307

The purpose of this form is to provide the Technical Committees of JEDEC with input from the industry regarding usage of the subject standard. Individuals or companies are invited to submit comments to JEDEC. All comments will be collected and dispersed to the appropriate committee(s).

If you can provide input, please complete this form (it can be edited with Acrobat Reader) and return to:

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1. I recommend changes to the following:

☐ Requirement, paragraph number \_\_\_\_\_

☐ Test method number \_\_\_\_\_ Paragraph number \_\_\_\_\_

The referenced paragraph number has proven to be:

☐ Unclear ☐ Too Rigid ☐ In Error

☐ Other \_\_\_\_\_

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2. Recommendations for correction:

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3. Other suggestions for document improvement:

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